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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,567	06/07/2001	William R. Dudley	55806USA1A.002	7795

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EXAMINER
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CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 01/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/876,567

Applicant(s)

DUDLEY ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31, 33-54 and 56-66 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 47-51 and 59 is/are allowed.
- 6) ☒ Claim(s) 1-31, 33-46, 52-54, 56-58 and 60-66 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 30, 2004 has been entered.

This Office action addresses claims 1-31, 33-54, and 56-66. Claims 47-51 and 59 are allowed. Claims 1-24, 57, and 58 remain rejected under 35 USC §112, first paragraph but contain allowable subject matter. Claims 25-31, 33-46, 52-54, 56 and 60-66 remain rejected for substantially the reasons of record. This action is non-final.

### ***Claim Objections***

2. Claim 56 is objected to because of the following informalities: the claim now depends on cancelled claim 55. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. Claims 1-24, 57, and 58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 57 recite that the substrate comprises a “release liner.” The closest support for this recitation is found at page 18, line 10, which discloses “silicone release liners.” However, there does not appear to be sufficient disclosure that the Applicants had possession of release liners made of materials other than silicone, which are encompassed by the claim language. As such, the language is considered to constitute new matter into the application.

***Claim Rejections - 35 USC § 103***

4. Claims 25-31, 33-46, and 60-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson (U.S. Patent 6,488,721) in view of Liu et al (U.S. Patent 6,159,544).

Carlson teaches a battery component (38, 39) comprising an anode (710), a separator (102), a cathode (201), an edge material (301) contacting an edge of the cathode, and a cathode current collector (401) (see Fig. 10, col. 32, line 15 et seq.). A substrate (2) is coated with a separator material (102), followed by an edge material (301) and a cathode material (201), thereby “improving” the thickness profile of the cathode (see Fig. 6). The edge material acts as a physical boundary. The substrate may also be coated with a cathode material (201) and then the edge material (301) such that the cathode material and edge material touch each other (see Fig. 5). The edge material is capable of functioning as a barrier to moisture and light. The cathode

and edge layers may be solvent coated (see col. 27, line 10). The cathode material edge is approximately square and has a uniform thickness profile and a width of less than 200 microns (see col. 18, line 2; Fig. 5). The cathode and edge layers may be extrusion coated (see col. 27, line 15). The cathode material layer may be calendered (see col. 17, line 57). The edge material may comprise an electrically insulating thermoplastic polymer such as an ethylene, propylene, or urethane (see col. 25, line 10). The wet and dry coating thicknesses of the edge material are approximately equal to the wet and dry coating thickness of the cathode material (see Fig. 5; col. 25, line 1). The cathode material comprises an electrode active material, an electrically conductive material, and an ionically conductive material (e.g., ionically conducting polymer, electrolyte salt) (see col. 17, line 60; col. 29, line 43 et seq.). The cathode material and the edge material are “immiscible” because distinct layers are formed upon coating. The shape of the cathode edge is inherently altered by the presence of the edge material. The cathode thickness is in the range of 5 to 200 microns (e.g., 100 microns), which anticipates the ranges of bulk and edge cathode thicknesses. The substrate (2) may comprise paper, a metal foil, or a silicone release liner (see col. 16, line 61 et seq.). The separator layer in contact with the cathode may comprise a solid polymer electrolyte (see col. 29, line 43). Further, regarding claim 25, the edge material may be non-viscoelastic (see col. 27, line 17). Regarding claim 44, Carlson teaches a slitting step in column 26, line 16.

However, Carlson does not teach that the cathode and edge layers are coated substantially simultaneously by a die coater having at least two slots, as recited in claims 25, 29, 36, and 39.

Liu et al. is directed to a die coater having multiple substantially parallel slots for coating adjacent layers of different material on a substrate (see abstract; Fig. 1). Shims are arranged in the slots to form the stripes (see col. 4, lines 40-46).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the die coater of Liu et al. to form the cathode and edge layers of Carlson. In column 2, line 32, Liu et al. teach that the disadvantages of the prior art include “non-uniform width of stripes” and “ambiguous interfaces of coating solutions.” Further, in column 2, line 43, the reference teaches that an object of the invention is to provide “distinct interfaces” between stripes. Accordingly, this would provide the artisan sufficient motivation to use the die coater of Liu et al. to form the cathode assembly of Carlson.

Regarding the ranges of separation distance and substrate speed recited in claims 30 and 31, these ranges are not considered to distinguish over the references. A small (e.g., <5 mm) separation between slots would be necessary to obtain the touching stripes disclosed by Liu et al. Additionally, the substrate speed may be adjusted by a skilled artisan depending on the viscosity of the coating mixtures and desired thickness of the coatings.

Regarding claims 41-43, the die of Liu et al. may be considered to be a “dual slot extrusion die,” a “slot fed knife die,” and a “fluid bearing die.” The definition of each type is provided in column 7 of U.S. Patent 6,051,297 (Maier et al). The main differences are in the viscosity of the material being coated and the arrangement of the ancillary rollers, but neither of

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these features affect the basic structure of the die. Thus, the die of Liu could be used to perform any of these coating processes.

5. Claims 52-54 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (U.S. Patent 6,521,382) in view of Carlson.

Regarding claim 52, Song et al. teach a battery in Figure 3 comprising the following sequential layers: anode (1), first electrolyte (separator) (4), first cathode (6), cathode current collector (8), second cathode, and second separator. Regarding claim 52, the electrolyte is a solid polymer electrolyte (see abstract).

The reference does not expressly teach that an edge material contacts the edge of the cathode, as recited in claim 52.

As set forth above, Carlson teaches a battery comprising a polymeric cathode edge material layer (301).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Carlson to use an edge material in the cathode of Song et al. In column 23, line 5, Carlson teaches the following:

This absence of full coverage of the cathode active layer directly over the surface of the microporous separator layer or, alternatively, indirectly over the surface of a protective coating layer which is over the microporous separator layer may be beneficial to allow the coating of edge insulating layers in desired patterns on the separator layer and in contact with a portion of the cathode active layer to reduce the possibility of short-circuiting of the electrodes when fabricated into an electrochemical cell. This is also typically

Thus, the coating of edge insulating layers in the cathode of Song et al. would be beneficial to help prevent short-circuiting of the electrodes. The edge material would function as a light and moisture barrier, and would further prevent contact between the anode and the cathode current collector.

### *Response to Arguments*

6. Applicant's arguments filed August 30, 2004 have been fully considered but they are not persuasive. Regarding the 35 USC §112, first paragraph rejection, Applicants assert that the term "release liner" is not new matter because other forms of release liners in addition to silicone are disclosed in the specification. However, as set forth in the advisory action of September 14, 2004, it is not clear that a person of ordinary skill in the art would have appreciated the other materials (polyester, polyethylene, etc.) as being capable of functioning as release liners. It is believed that the record should be further developed in this regard, i.e., evidence should be presented indicating that the materials disclosed in the specification are usable as release liners.



Regarding claim 52, Applicants assert that “because of the differences between structures of the Carlson reference and structures of either the Song et al. reference or amended claim 52, the combination of the Carlson reference and the Song et al. reference cannot be said to teach or suggest the subject matter of amended claim 52.” However, it is believed that the Carlson reference provides sufficient motivation to use its edge material in a different battery structure, i.e., the structure of Song et al. The problem cited by Carlson (short circuits) is present in a variety of battery structures as would be appreciated by person of skill in the art. As such, the fact that Song et al. and Carlson et al. disclose different battery structures would not, in and of itself, be sufficient to dissuade an artisan from applying the relevant teachings of Carlson to Song. Accordingly, the rejection is still believed to be proper.

Regarding the rejection based on Carlson in view of Liu, Applicants assert that because Carlson does not suggest simultaneous coating of the cathode and edge layers, the reference implicitly indicates that “it was not understood that such methods could be useful in preparing a functional structure.” However, the Carlson reference is not required to explicitly or implicitly suggest this for the combination of references to be proper. The motivation to combine is found in Liu, which teaches that the coated interfaces are crisper and less ambiguous by virtue of using a slotted die-coater. Accordingly, there is still believed be sufficient motivation and a reasonable expectation of success to use the apparatus of Liu to coat the layers of Carlson.

***Allowable Subject Matter***

7. Claims 47-51 and 59 are allowed.
8. Claims 1-24, 57, and 58 would be allowable if the 35 USC §112, first paragraph rejection was overcome.

9. The following is a statement of reasons for the indication of allowable subject matter:

The reasons for allowance of claim 59 were previously given and remain applicable.

Regarding claim 1, Carlson teaches coating cathode material on a microporous separator material, which itself is coated on a substrate. However, claim 1 requires that the cathode material be in contact with the surface of the substrate. Even if the microporous separator of Carlson is considered to be a substrate, it does not comprise any of the species recited in claim 1, i.e., paper, metallic foil, metal coated paper, metal coated polymer, or a release liner. As such, claim 1 is allowable.

Claim 47 also recites that the cathode material is in contact with the surface of the substrate, and further recites a separator material coated onto the cathode material. Carlson also does not teach or fairly suggest this subject matter.

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1746  
January 4, 2005